

## Effectiveness of Scaffolding and Zone of Proximal Development on Students' Achievement in the Context of Collaborative Learning

Aabida Lateef<sup>1</sup>, Muhammad Arshad Dahar<sup>2</sup> & Fayyaz Ahmad Faize<sup>3</sup>

### *Abstract*

*This study intends to evaluate the use of scaffolding to fulfill the zone of proximal development (ZPD) gap in collaborative learning in the subject of English and verify its effectiveness for students' achievement at secondary school level. The population of the study consisted of public sector secondary students in the city of Rawalpindi. The study applied pretest posttest control group experimental design. A test in the subject of English was developed and used as an achievement test for the purpose of pretest and posttest measurement. The self-developed achievement test was used to pretest the randomly selected students of 10<sup>th</sup> Grade in the experimental as well as control groups. The students of experimental group were taught by providing scaffolding to fulfill the ZPD gap in collaborative learning whereas control group was taught through traditional teaching method. The study explored the significant effect of teaching on students' achievement by providing scaffolding and fulfilling the gap of ZPD in collaborative learning environment.*  
**Keywords:** scaffolding, collaborative learning, zone of proximal development (ZPD)

### **Introduction**

Scaffolding was introduced by Wood, Bruner and Ross (1976) as a symbol for expert tutor that provides support for progress and achievement of a child through a quite complicated task. Later on, Bruner (1978) discussed about scaffolding that it is a support provided by teachers to students to assist them in solving the difficult task that could not be completed without facilitation. The concept of scaffolding has been derived and linked to Vygotsky's perception of the Zone of Proximal Development (ZPD), as explained by Vygotsky (1978) that it is the gap between potential level and

---

PhD Student, Department of Education, PMAS Arid Agriculture University Rawalpindi<sup>1</sup>  
Assistant Professor, Department of Education, PMAS Arid Agriculture University Rawalpindi<sup>2</sup>  
Assistant Professor, Department of Humanities, COMSAT Institute of Science and Technology<sup>3</sup>

real developmental level and to solve problems independently and by seeking help from elders one or in coordination with more expert person respectively. In traditional psychology, Vygotsky (1978; 1987) has discussed with arguments that ZPD is a controlling substitute to one's ability model to use for testing. He further highlighted how a more knowledgeable person can help a child instead of evaluating what a child can do without help. He said that difference lies between the conceptual development and the existing potential of an individual that can only be explored by providing help to students with well-thought plan. He further claimed that development of cognition appears first at social level and then he becomes able to appear in individual way. ZPD is the powerful area in which the conversion of inter-mental (social) level to intra-mental (individual) level takes place.

### **Review of Literature**

The above mentioned concept of ZPD received special attention by several researchers as they considered it as a major element in learning process where children are provided help by more knowledgeable members of the society (Rogoff, 1982b, Rogoff, Gauvain & Ellis, 1984; Rogoff, 1990). Likewise, many studies analyzed this concept of ZPD for language interaction between teachers and learners (Wertsch, 1985; Tharp and Gallimore, 1988). They have highlighted that teachers, parents or any person who is more expert than the child can provide directions to the child which results in child's imitative response. Similarly, various researches (Maybin, Mercer, & Stierer, 1992; Mercer, 1995) discussed that teacher can facilitate a student for understanding the given task. The task is completed by applying scaffolding tools such as questions, responses and their clear understanding. Moreover, Akbar (2002), according to Vygotsky highlighted the two achievement levels known as potential level and actual level of the student. He indicated the gap between both levels to be ZPD. This gap can be overcome by interaction of

peer or guidance provided by teachers. Thus, instruction in class and interaction among students was given due consideration according to students' potential level. In addition, according to Brooks and Margaret (2002) 'ZPD' is the sector between the tasks assigned to the child what he can do independently and what a child can do with help of more expert than him. Similarly, according to Raymond (2000) the distance or gap between the self ability of doing without help and ability of doing with the help of skilled and experienced person is known as ZPD gap. Furthermore, Tharp and Gallimore (1988) discovered that ZPD consists of four stages cycle. In their view, performance can be enhanced and improved by the help of more knowledgeable person. Another point they raised was the lack of coordination in performance that leads to the back through the ZPD. So it is important to focus on coordination to get benefit from ZPD.

### **Working of scaffolding with ZPD**

The connection between 'scaffolding' and ZPD is considered as a fundamental concept in teaching learning process. According to Vygotskian views individuals can get benefit from connections with society by taking help from peers that have more ability than others. In this way learner shifts from inferior level to advance level. This guidance or help is known as scaffolding. The teaching strategy based on scaffolding offers assistance to learners according to their ZPD (Chang, Sung & Chen, 2002). In support of the above mentioned views, Olsan and Platt (2000) extended the concept of scaffolding that scaffolding provides facilitation to enhance learners' talent to fabricate the former information and internalize new knowledge. So, the activities involved in the instruction of scaffolding are very far away from the students' level of what he can do independently. Scaffolding is given to the students by more able persons to complete the given task that cannot be possible to be completed lonely. In this way students are assisted through the scaffolding (Bransford,

Brown & Cocking, 2000). A number of researches agreed on the theory given by Vygotsky and considered the ZPD as the most prominent and sensitive concept of scaffolding (Berk, 2001; Daniels, 2001; Wells, 2001; Krause et al, 2003; McDevitt & Ormrod, 2002). On the other hand, the explanation of the scaffolding is considered to be different. It is regarded as the direct application of Vygotsky's concept of teaching learning process in ZPD (Wells, 1999). In contrast, Daniel (2001) has given his opinion that scaffolding does not completely reveal the affluence of ZPD. Additionally, Stone (1998) has exposed the limitation of scaffolding metaphor for the explanation of ZPD.

### **Working of scaffolding with ZPD in Collaborative learning**

Collaborative learning is basically an instruction method that involves students' performance at various levels to work together for achievement of the goal. Thus, in this way all students work together and help each other to obtain success. Collaborative learning brings change during instruction method in which group working is done to achieve a common academic goal. Wide research has been done for the exploration of the concept of collaborative learning, how to make groups and pairs to achieve the set goal (Gokhale, 1995). Golub (1988) highlighted that collaborative learning has an important characteristic as it allows students to communicate with each other and as a result this communication leads towards their learning. Basically, collaborative learning deals with the roots of teaching learning process. Collaborative learning enhances the role of teachers as well as students to go through multifarious changes that demands more responsible behavior in the classroom (Finkel and Monk, 1983; MacGregor, 1990). The classroom is not only based on single teacher and students learning but it develops interdependent relation between teacher and students and has strengthened the power of teacher and student relationship (Romer and Whipple, 1990). So, learning also takes place collaboratively among students of same level of understanding (Littleton &

Light, 1999; Cowie & van der Aalsvort, 2000). Furthermore, Mcleod, (2012) according to Vygotsky's theory uncovered that students having different capability levels are divided into groups to enhance their learning by more advance peer learners within their ZPD (Mcleod, 2012).

Many research studies (Wood, Bruner, and Ross (1976); Newman, Griffin and Cole (1989); Cazden (1981); Rogoff (1990); Tharp and Gallimore (1988) have shown great interest for the concept of ZPD, as it involves the support provided within ZPD. However, they have discussed it with different concepts. Likewise, Fernandez et al. (2001) explained the related concept of scaffolding and ZPD in their work. They stated that these two concepts may be applied to help learners in teaching learning process for achievement of the task that is difficult for learners to reach when working alone. Moreover, the concept of ZPD is the extensively familiar and renowned term applied for the association of ideas and elaborated and more particular than its ordinary meanings (Chaiklin, 2003). This concept may be studied thoroughly in order to have in-depth study of it, its broader concept should be taken into consideration within the structure of entire system of Vygotsky's theory of constructivism. Up to now, a large number of research studies were conducted to find out effectiveness of scaffolding in collaboration with peers or working of tutor students or writing journal. (Aljaafreh & Lantolf, 1994; De Guerrero & Villamil, 2000; Nassaji & Cumming, 2000; Nassaji & Swain, 2000). Similarly, Mirzaee (2008) found considerable effect of ZPD on the selected participants. However, not a comprehensive study on the effectiveness of scaffolding and ZPD was conducted in Pakistan in collaborative learning. Following objectives were there to guide the study;

1. To teach experimental group by providing scaffolding for fulfilling the ZPD gap and the control group through traditional method of teaching.

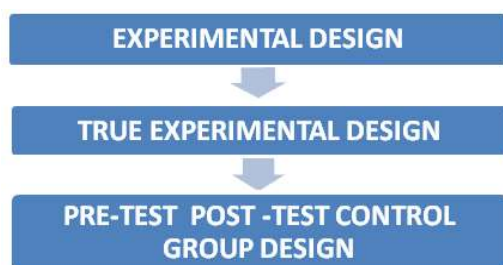
2. To find out the effect of scaffolding and ZPD in the context of collaborative learning on the students' achievement in the experimental group.
3. To find out the effect of traditional method of teaching on the students' achievement in the control group.
4. To compare the effect of scaffolding for fulfilling the ZPD gap in collaborative learning in the experimental group with that of traditional method in the control group.

### **Hypothesis**

H<sub>1</sub>: There is significant difference between mean achievement scores of students taught by providing scaffolding to fulfill the ZPD gap and students taught by traditional teaching method in the subject of English.

### **Research Methodology**

The study used “pretest posttest control group design” that is true-experimental design. The nature of the study is quantitative and experimental.



The selected students were pretested through the self developed achievement test and then two groups were formed by using matching technique. After treatment or experiment, both control group and experimental groups were post tested. The posttest scores were compared to determine the effectiveness of scaffolding and ZPD. There are two types of variables i.e. independent and dependent variables. Teaching methods are the independent variables in this study. Teaching to the experimental group through scaffolding

to fulfill the ZPD gap in collaborative learning and teaching through traditional teaching method to the control group were independent variables. The dependent variable is the students' achievement in the subject of English in this study. Intelligence factor, treatment duration, age, size of selected participants, content of the subject taught by different methodologies and teacher's effect are the Controlled variables. Uncontrolled Variables were socio-economic status, home background, motivation, anxiety etc. Secondary students of 10<sup>th</sup> Grade (session 2014-15) of public sector in the subject of English in Rawalpindi City were the population. Eighty students of Grade-10 from F.G. Girls High School Misrial Road, Rawalpindi were initially selected randomly. Pretest was conducted for the sampled students. Matching technique was used to divide the students into two groups i.e. control group and experimental group on the basis of pretest. Random technique through tossing a coin was used to assign the treatment of experiment through scaffolding and ZPD.

Researcher taught both groups by herself because if two different teachers were involved to teach, there may be occurrence of any extraneous variable like difference of experience between two teachers etc. Experimental group was taught by providing scaffolding in the ZPD in collaborative learning method and the students of control group were taught through the traditional teaching technique.

### **Research Instruments**

The study evaluated the effect of scaffolding to fulfill the ZPD gap in experimental group. For evaluating the effect of teaching methods on students' learning, test was developed on English subject. Moreover, this test was used for the measurement of students' achievement. The researcher developed an achievement test in the subject of English for the specific topics and lessons where as number of items were developed by considering first three wrungs of

cognitive domain; knowledge, comprehension and application on the basis of table of specification. Test comprised of 100 multiple choice questions, each carrying one mark. Try out was done before conduction of original study. Test developed on English subject was validated by three experts who have command on language and content. Reliability was calculated by using split half method that was 0.75.

Researcher took permission from the administration of F.G Girls Higher Secondary School, Misrial road, Rawalpindi for the execution of the study. Pretest was conducted on the selected students. As total sample consisted of 80 students, two groups (40 in each group) were formulated by using matching technique on the basis of their pretest scores. After making two groups, treatment was assigned randomly by tossing a coin. Scaffolding was provided to experimental group to fulfill the ZPD gap in collaborative learning environment. Students were divided into 10 groups; each group consisted of 4 students. Worksheets and discussions were carried out throughout the experiment. Different tasks related to the course content were also assigned to students and were completed with the help of facilitator. Whereas, students in control group were taught through traditional teaching method. Researcher herself taught both groups in different timings. Experiment continued for two months. The posttest was administered soon after the teaching was over. Final data were collected from the students of the both groups.

## **Results**

The research calculated mean score and differences, and standard deviations (S.D.) after scoring the posttests of two groups. Paired sample t-test was used to compare the score of pretests and posttests of both the experimental and control groups. It showed the benefit that students got from the instruction. The independent t-test was also used to compare the independence of separate samples of pretest and posttests of both groups.

Table 1: *Significance of difference between the pretest and posttest Mean achievement scores of Experimental Group*

Test	Mean	N	S.D.	SEM	t-value	P
Pretest	30.95	40	10.67	1.68	-	.000
Posttest	80.82	40	9.87	1.56	185.82	
df= 39				*significant		

Table 1 indicates mean achievement scores of experimental group on pretest and posttest were 30.95 and 80.82 respectively. SD from the mean was 10.67 and 9.87 on pretest and posttest respectively. The study found higher achievement scores in posttest for average students and lower achievement scores in pretest for experimental group. A significant difference was identified on pretest and posttest score of achievement in experimental group at 0.05 level of significance. It is interpreted that after the treatment of experimental group through teaching by using scaffolding and ZPD technique, the students shows much better scores in experimental group on posttest when compared to scores of the pretest.

Table 2 *Significance of difference between the pretest and posttest Mean achievement scores of Control group*

Groups	Mean	N	S.D	SEM	t-value	P
Pretest	30.80	40	10.67	1.68	-43.16	.000
Posttest	47.30	40	12.03	1.90		
df= 39				*significant		

Table 2 shows that mean score of control group on pretest as 30.80 and posttest as 47.30. The SD from the mean on pretest and posttest were 10.67 and 12.03 respectively. The achievement scores on posttest for average students were also higher than that of pretest scores in control group. There was a significance difference between mean achievement scores on pretest and posttest at 0.05 level. So it can be said that students in control group performed better on posttest than pretest.

Table 3 *Significance of difference between the Posttest Mean Achievement Scores of Experimental and control Group*

Groups	Mean	N	S.D	SEM	t-value	P
Experimental	80.82	40	9.87	1.56	13.61	.000
Control	47.30	40	12.0	1.90		
df=78		* significant				

Table 3 shows that the differentiation between the mean scores of both groups on posttest was quite high. The difference greatly supported experimental group. It showed that the students in the experimental group who received treatment in collaborative learning method of teaching (by providing scaffolding to fulfill the ZPD gap) shown much improved scores as compared to the students in control group who were taught through conventional method.

### Discussion

The current study tends to find out the effect of scaffolding to fulfill the Zone of proximal development gap in collaborative learning in the subject of English and verify its effectiveness for students' achievement at public secondary school level in Rawalpindi district. Pre-test post-test control group experimental design was employed in the present study. Two groups were formulated (experimental and control group) through matching after pre-test with equal number of students in each group. Experimental group was taught through scaffolding within ZPD through collaborative learning and control group was taught through conventional teaching method.

Current study results illustrated that experimental group that received treatment performed better than the other group that was controlled. It is evident from the study results that collaborative classroom motivates both learner and facilitator. Collaborative learning is basically concerned with learning and understanding with others. Collaborative learning is not limited to one child only it welcomes everyone to join, participate and grow (Smith and MacGregor, 1992). The present study results matched with the study results of

Aljaafreh and Lantolf (1994) who highlighted the eminent role of scaffolding within the learners' ZPD. Likewise, study conducted by Nassaji and Swain (2000) also uncovered the structured scaffolding in accordance with ZPD. Additionally, Guk and Kellogg (2007) study results showed the active participation of all students in class with scaffolding provided by teacher. Similarly, a study on analysis of role of scaffolding in teaching English as a language was conducted by Hammond (2002) that showed significant results. Another study conducted by Verity (2005) has focused on the prominent role of the learner's centrality in scaffolding. On the contrary, Daniel (2001) and Stone (1998) have revealed the limited role of scaffolding in collaborative learning.

### **Conclusions and Recommendations**

To conclude this study, substantial effect was found of the treatment given to the experimental group by teaching students with scaffolding in order to fulfill the gap of ZPD in collaborative learning method as compared to traditional teaching method. Students who were given treatment took interest by learning through collaborative learning and enjoyed more than the students who were taught through the conventional method. Learning was enhanced in students who received scaffolding as they performed much better at posttest than pretest. For implication of the current study as the fact is prominent that students could get advantage from the ZPD based intervention and scaffolding provides grounds for the development of curriculum and to design syllabus at secondary level. Teacher can get benefit by taking insight from the diverse ZPD based mechanism of scaffolding in order to raise the awareness of students of scaffolding dynamics. Future studies may be conducted for the exploration of the extent of the scaffolding provided during the study. In addition, appropriate attention should be given for the investigation of

innovative methods that may contribute to the development of second language learning skills.



This work is licensed under a  
Creative Commons Attribution 4.0 International Licence.

## References

- Akbar, A. (2002). Analysis of zone of proximal development (ZPD) in graduate teacher training programme of Allama Iqbal Open University and development of a strategy to achieve ZPD incidence using Delphi technique. Unpublished PhD thesis, Faculty of Education. Islamabad: Allama Iqbal Open University.
- Aljaafreh, A., & Lantolf, J.P. (1994). Negative feedback as regulation and second language learning in the zone of proximal development. *The Modern Language Journal*, 78, 465-83.
- Berk, L. (2002). *Child Development* (5<sup>th</sup> Ed). Boston: Allyn & Bacon
- Bransford, J., Brown, A., & Cocking, R. (2000). *How People Learn: Brain, Mind, and Experience & School*. Washington, DC: National Academy Press.
- Brooks, Margaret, L. (2002). Drawing to learn. Unpublished Ph. D thesis, Alberta: University of Alberta, Canada: 39-43.
- Bruner, J. (1978). The role of dialogue in language acquisition. In A. Sinclair, R. Jarvella and W. J. M. Levelt (Eds.), *The Child's Conception of Language* (241-256). New York: Springer.
- Cazden, C. B. (1981). Social context of learning to read. *Comprehension and teaching: Research reviews*, 118-139.
- Chaiklin, S. (2003). The zone of proximal development in Vygotsky's analysis of learning and instruction. In A. Kozulin (Ed) *Vygotsky's Educational Theory in Cultural Context*. Cambridge, Pp. 39-64
- Chang, K., Chen, I., & Sung, Y. (2002). The effect of concept mapping to enhance text comprehension and summarization. *The Journal of Experimental Education* 71(1), 5-23.
- Cowie, H., and van der Aalsvort, G. (Eds.). (2000). *Social Interaction in Learning and Instruction*. Oxford: Pergamon.
- Daniels, H. (2001). *Vygotsky and Pedagogy*. NY: Routledge/Falmer
- De Guerrero, C.M., & Villamil, O.S. (2000). Activating the ZPD: Mutual scaffolding in L2 peer revision. *The Modern Language Journal*, 84, 51-67.
- Fernandez, M., Wegerif, Rupert and Drummond, S. R. (2001). *Re-conceptualizing "Scaffolding" and Zone of Proximal Development in the Context of Symmetrical Collaborative Learning*, *JCT*, 36 (2), 1-3
- Finkel, D. L. and G. S. Monk. (1988.). "Teachers and Learning Groups:

- Dissolution of the Atlas Complex.” In C. Bouton and R. Y. Garth (Eds.) *Learning in Groups*. New Directions for Teaching and Learning, no. 14 San Francisco: Jossey-Bass.
- Gokhale, A.A. (1995). Collaborative Learning Enhances Critical Thinking, *JTE*: 7(1).
- Golub, J. (Ed). (1988.) *Focus on Collaborative Learning*. Urbana, IL: National Council of Teachers of English.
- Guk, L., & Kellogg, D. (2007). The ZPD and whole class teaching: Teacher-led and student-led interactional mediation of tasks. *Language Teaching Research*, 11, 281-299.
- Hammond, J. (Ed.) (2002). *Scaffolding Teaching and Learning in Language and Literacy Education*. Newtown, Australia: PETA
- Krause, K., Bochner, S. & Duchesne, S. (2003) *Educational Psychology for Learning and Teaching*. Australia: Thomson
- Littleton, K., and Light, P. (1999). *Learning with Computers: Analysing Productive Interaction*. London: Routledge.
- MacGregor, J. (1990) “Collaborative Learning: Shared Inquiry as a Process of Reform.” In M. Svinicki, (Ed.) *The Changing Face of College Teaching*. New Directions for Teaching and Learning, no. 42, San Francisco: Jossey-Bass.
- Maybin, J., Mercer, N., and Stierer, B. (1992). ‘*Scaffolding*’ learning in the classroom. In K. Norman (Ed.), *Thinking Voices* (pp. 186-195). London: Hodder and Stoughton Press.
- Mercer, N. (1995). The Guided Construction of Knowledge: *Talk amongst Teachers and Learners*. Clevedon: Multilingual Matters.
- McDevitt, T.M. & Ormrod, J.E. (2002) *Child Development and Education*. Upper Saddle River, NJ: Merrill Prentice Hall.
- Mcleod, S. (2012). Zone of proximal development. Retrieved November 17, 2016, from <http://www.simplypsychology.org/Zone-of-Proximal-Development.html>
- Mirzaee A. (2008). On the effect of the ZPD-sensitive dialogic discourse scaffolding on the microgenetic appropriation of metadiscourse in task-based EFL writing. Unpublished doctoral dissertation. Allameh Tabataba'i university. Tehran: Iran.
- Nassaji, H., & Cumming, A. (2000). What's in a ZPD? A case study of a young ESL student and teacher interacting through dialogue journals. *Language Teaching Research*, 4, 95-121.
- Nassaji, H., & Swain, M. (2000). A Vygotskian perspective on corrective feedback in L2: The effect of random versus negotiated help on the learning of English articles. *Language Awareness*, 9, 34-41.
- Newman, F., Griffin, P., & Cole, M. (1989). *The construction zone: Working for cognitive change in school*. Cambridge: Cambridge University Press.
- Olson, J. and Platt, J. (2000). *The Instructional Cycle. Teaching Children and*

- Adolescents with Special Needs*, 170-197. Upper Saddle River, NJ: Prentice-Hall, Inc.
- Raymond, E. (2000). Cognitive Characteristics. *Learners with Mild Disabilities* (169-201). Needham Heights, MA: Allyn & Bacon, A Pearson Education Company.
- Rogoff, B., (1982). Integrating context and cognitive development. In M. E. Lamb & A. L. Brown (Eds.), *Advances in developmental psychology*, 2. Hillsdale, NJ: Erlbaum.
- Rogoff, B., Gauvain, M., & Ellis, S. (1984). Development viewed in its cultural context. In M. H. Bornstein & M. E. Lamb (Eds.). *Developmental psychology* (533-571). Hillsdale, NJ: Earlbaum.
- Rogoff, B. (1990). *Apprenticeship in Thinking: Cognitive Development in Social Context*. New York: Oxford University Press.
- Romer, K. and W. Whipple. ( 1990). "Collaboration across the Power Line." *College Teaching*, 39 (2).
- Smith. B. L., and J. MacGregor. (1992). *Collaborative Learning: A Sourcebook for Higher Education*. University Park, PA: National Center on Postsecondary Teaching, learning and Assessment (NCTLA). 9-22.
- Stone, A. (1998) The Metaphor of Scaffolding: Its Utility for the Field of Learning Disabilities. *Journal of Learning Disabilities*, 3 (4) 344-364
- Tharp, R. G., & Gallimore, R. (1988). Rousing minds to life.
- Verity, D. (2005). Vygotskian Concepts for teacher education. Pan-SIG Conference "Lifelong learning" *proceedings*. Retrieved from <http://jalt.org/pansig/2005/HTML/Verity.htm>
- Vygotsky, L. S. (1978). *Mind in Society: the Development of Higher Psychological Processes*. Cambridge, MA: Harvard University Press.
- Vygotsky, L. S. (1987). *Thinking and Speech*. In R. W. Rieber & A. S. Carton (Eds.), *The Collected Works of L. S. Vygotsky*, volume 1: Problems of General Psychology, 1, 39-285. New York: Plenum.
- Wells, G. (1999) *Dialogic Inquiry: Towards a Sociocultural Practice and Theory of Education*. New York: Cambridge University Press
- Wells, G. (Ed.). (2001). *Action, talk, and text: Learning and teaching through inquiry* (Vol. 16). Teachers College Press.
- Wersth, J. (1979). *From social interaction to higher psychological processes: A clarification and application of Vygotsky's theory*. Human Development, 22, 1-22.
- Wertsch, J. (1985) *Vygotsky and the Social Formation of Mind*. Cambridge, MA: Harvard University Press.
- Wood, D., Bruner, J., & Ross, G. (1976). The role of tutoring in problem-solving. *Journal of Child Psychology and Child Psychiatry*, 17, 89-1
- Working of scaffolding within ZPD. (2015). Retrieved from [www.educ.utas.edu.au](http://www.educ.utas.edu.au).